



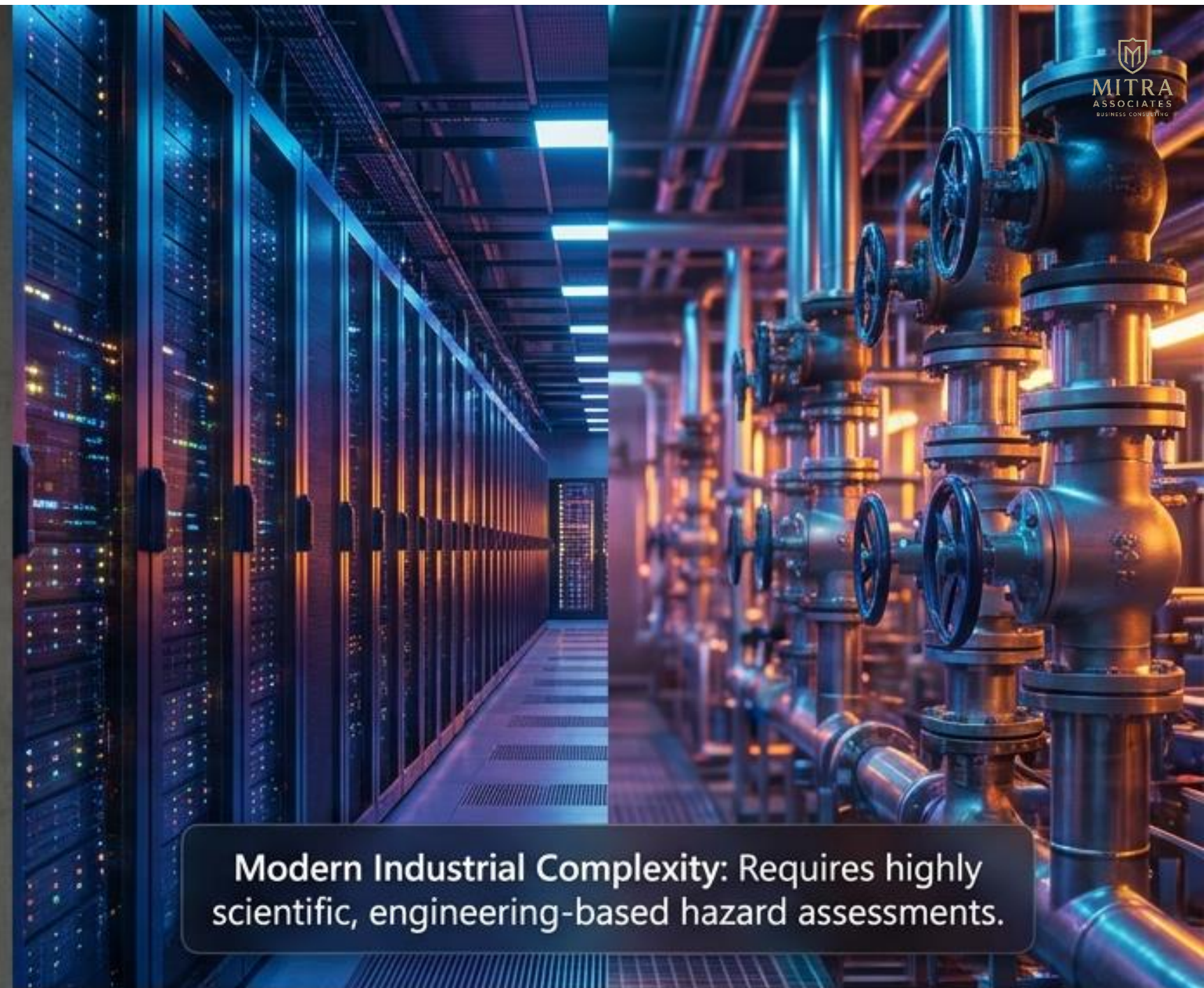
Integrated Engineering for Modern Industrial Resilience

Comprehensive Risk Assessment,
Statutory Compliance & Engineering Studies

* Protecting People • Assets • Business Continuity • Environment • Regulatory Compliance



The Old Standard: Periodic inspections and checklist-based fire extinguisher maintenance.



Modern Industrial Complexity: Requires highly scientific, engineering-based hazard assessments.

Today's organizations need rigorous evaluations to verify protection system adequacy, identify hidden hazards, and ensure legal compliance with recognized engineering standards.

	Standard Safety Inspections	Mitra Engineering-Based Assessments
Methodology	 Visual checks, rule-of-thumb estimates.	 Scientific modeling, incident energy calculations, and precise floor area analysis.
Scope	 Code-minimum compliance and visual equipment checks.	 Deep integration of Fire, Electrical, and Process hazards (e.g., Arc Flash boundaries, Dust explosions).
Deliverables	 Static checklists and pass/fail reports.	 Dynamic Risk Registers, detailed CAPA Trackers, and Executive Cost-Benefit Roadmaps.
Ultimate Value	 Basic audit survival.	 Business continuity, capital optimization, and proactive risk management.

Fire Risk & Protection Engineering

- Fire Safety Risk Assessment (FSRA)
- Occupancy Load Analysis
- Fire Load Density
- Protection System Adequacy

Advanced Electrical Safety

- Arc Flash Hazard Quantification
- General Electrical Assessment
- Thermography & Bonding Verification

Process Hazards & Emergency Readiness

- Fire & Explosion Hazards
- Emergency Preparedness & ICS
- Engineering Documentation Review

Pillar 1: Fire Risk & Protection Engineering

Fire Safety Risk Assessment (FSRA)

Systematically identifying ignition sources, fuel sources, and critical fire scenarios.

Output: Risk Ranking Matrix.

Occupancy Load Analysis

Determining maximum safe capacity through floor area analysis, exit width calculations, and stair capacity to estimate precise evacuation times.

Fire Load Assessment

Calculating Fire Load Density (MJ/m^2) based on combustible material classification (plastics, solvents, raw materials) to predict fire severity.

Protection System Adequacy

Verifying that installed detection, suppression (deluge, water mist, clean agent), and pump automation meet the specific site hazards.

The Fire Scenario Triangle



Pillar 2: Advanced Electrical Safety

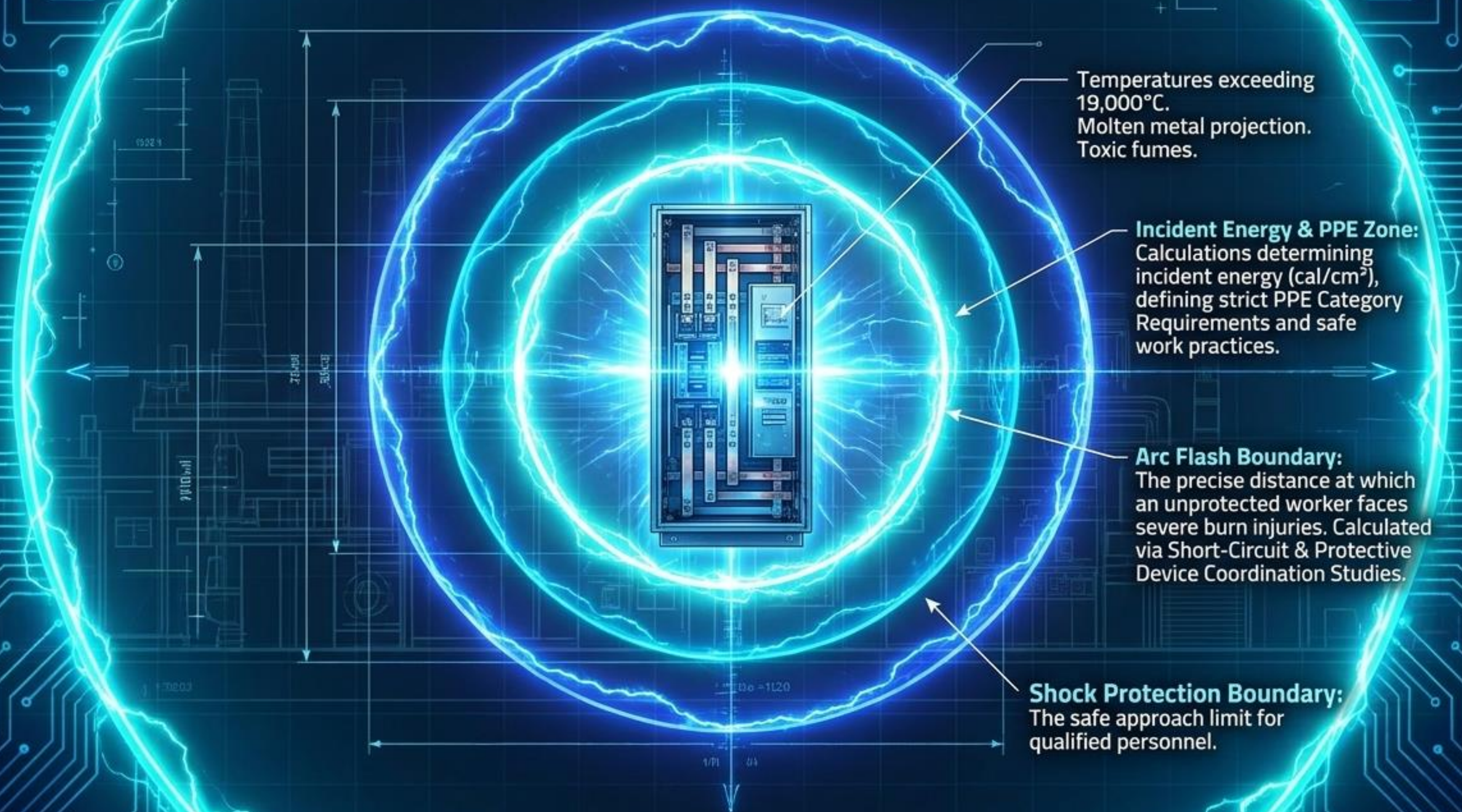
General Electrical Assessment

Going beyond basic checks. Evaluating earthing systems, bonding verification, and lightning protection. Utilizing thermography on HT/LT panels, assessing cable management, and verifying **LOTO (Lock Out Tag Out)** compliance.

Arc Flash Hazard Assessment

A specialized engineering study to quantify arc flash hazards, determine safe working practices, and protect personnel from catastrophic thermal and blast effects during maintenance or switching operations.

The Arc Flash Blast Radius



**Temperatures exceeding 19,000°C.
Molten metal projection.
Toxic fumes.**

Incident Energy & PPE Zone:
Calculations determining incident energy (cal/cm²), defining strict PPE Category Requirements and safe work practices.

Arc Flash Boundary:
The precise distance at which an unprotected worker faces severe burn injuries. Calculated via Short-Circuit & Protective Device Coordination Studies.

Shock Protection Boundary:
The safe approach limit for qualified personnel.

Pillar 3: Process Hazards & Emergency Readiness

Process & Explosion Hazards

Specialized risk classification for Dust Explosions, LPG/PNG systems, Hydrogen storage, and Hazardous Area Classifications.

Emergency Evacuation Architecture

Evaluating Incident Command Systems (ICS), disabled evacuation routes, emergency control centers, and mutual aid arrangements.

Engineering Documentation Review

Rigorous auditing of foundational site data: Single Line Diagrams (SLDs), Fire Pump Test Reports, Fire NOCs, and Building Drawings.

The Bedrock of Compliance: Statutory & Engineering Standards

Indian Legislation

The Factories Act (1948),
OSHC Code (2020), National
Building Code (NBC) 2016 – Part
4, Electricity Act (2003).

Bureau of Indian Standards (BIS)

IS 2189 (Detection), IS 15105
(Sprinklers), IS/IEC 62305
(Lightning Protection), and
specific earthing standards.

International Engineering Standards

NFPA Codes (10, 13, 20, 25,
70E, 101, 850 for Power Plants),
IEEE 1584 (Arc Flash), IEC
61482 & 62271.

From Hazard Identification to Executive Action



The Resilience Equation: Why Mitra Associates?

**(Multidisciplinary
Domain Expertise) × (Actionable
Engineering Solutions)**

**= Business Continuity, Capital Optimization,
& Proactive Safety Culture**

- Protecting people and critical assets while preventing downtime.
- Optimizing capital investment in fire protection and electrical systems.
- Moving beyond checklist compliance to a sustainable Safety Management System.



THANK YOU!

An expression of appreciation to clients and partners.

MITRA ASSOCIATES – BUSINESS CONSULTING

The core service offering and professional focus of the firm.

Please Contact us for More Details

Reach out to initiate further business discussions.

Email: rkc007@gmail.com

Phone: 7085055054

Website: www.mitrassociates.com